



[Designation of Document]Claims

[Claim 1]

A method of forming an un-vulcanized rubber strip as  
extruded from a die of an extruder, which is to be spirally  
5 wound to form a rubber part for tire manufacturing,

temperatures at a main-part casing, a screw shaft and  
a head region included with the die being controlled to be  
different from each other in a manner that: the temperature  
as controlled in the main-part casing is higher than that in  
10 the screw shaft; and the temperature as controlled in the head  
region is higher than that in the main-part casing, when  
continuously extruding a rubber material in a form of a ribbon.

[Claim 2]

A method of forming the rubber strip for tire  
15 manufacturing according to Claim 1, wherein the temperature  
as controlled in the die is equal to or higher than that in  
the head, when the extruding.

[Claim 3]

A method of forming the rubber strip for tire  
20 manufacturing according to Claim 1 or 2, wherein the rubber  
strip extruded from the die has a profile in which thickness  
is progressively reduced from at around centerline to edges  
on both sides; and width of the rubber strip is in a range of  
5 to 50 mm while the thickness of the rubber strip is in a range  
25 of 0.5 to 3.0mm at around the centerline, and in a range of

0.05 to 0.2mm at along the edges, when extruded in the form of a ribbon.

[Claim 4]

An apparatus for forming an un-vulcanized rubber strip  
5 as extruded from a die of an extruder, which is to be spirally wound to form a rubber part for tire manufacturing,

temperatures at a main-part casing, a screw shaft and a head region included with the die being set as controlled as to be different from each other in a manner that: the  
10 temperature as controlled in the main-part casing is higher than that in the screw shaft; and the temperature as controlled in the head region is higher than that in the main-part casing.

[Claim 5]

An apparatus for forming the rubber strip according to  
15 Claim 4, wherein the temperature as controlled in the die is equal to or higher than that in the head.

[Claim 6]

An apparatus for forming the rubber strip according to Claim 4 or 5, wherein said die is comprised of: a shoulder for  
20 narrowing-down a passage or throttling; a discharge port continuous with a distal portion of a cavity of the die through the shoulder; and an intermediate narrowing-down portion that is formed as stepped between distal and rear parts of the cavity and as disposed at substantially middle in the cavity with  
25 respect to a passage in flow-out direction from a rear opening

communicated with the head till the discharge port, so that a throttling or narrowing-down of a passage for a rubber material is made at the intermediate narrowing-down portion as well as at said shoulder.

5 [Claim 7]

A method for manufacturing a tire strip according to Claim 6, wherein, in a view from rearward, said distal part of the cavity appears to be a long hole arranged in conformity with longitudinal direction of the discharge port; and said  
10 distal part is continuous with said shoulder for narrowing down at distal side.

[Claim 8]

A method for manufacturing a tire comprised of a plurality of rubber parts, wherein, in respect of at least one  
15 of said rubber parts, there is used the rubber strip formed as extruded from the die of the extruder in a form of unvulcanized rubber strip by the method according to anyone of the claims 1 to 3; as to form the rubber part in a predetermined profile by feeding the rubber strip to a rotary support body  
20 for building the tire, to be wound and attached in a tire circumferential direction along a spiral in a manner partially overlapped.

[Claim 9]

A method for manufacturing a tire according to Claim  
25 8, wherein a positional misalignment in a tire circumferential

direction is restrained in a range of 0 to 5mm between start and end positions for winding and attaching of the rubber strip to form a rubber part of the tire.

[Claim 10]

5           A method for manufacturing a tire according to Claim 8 or 9, wherein extent of being overlapped is in a range of 1/2 to 1/5 of a width of said rubber strip, in a widthwise direction of the tire.

[Claim 11]

10           A method for manufacturing a tire according to anyone of Claims 8 to 10, wherein at least two of the plurality of rubber parts are formed by spirally winding and attaching respective ones of the rubber strips along a circumferential direction of the tire, at respective process steps for the  
15 winding and attaching, and

          wherein rotation-wise positions for starting of winding and attaching the respective rubber strips are disagreed with each other by 10 degrees or more in the circumferential direction of the tire.